

Program of Work  
in the Field of Science Policy  
of the  
U.S.-U.S.S.R. Joint Commission  
on Scientific and Technical Cooperation

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Policy

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PROTOCOL

ON THE SESSION OF THE US-USSR JOINT  
WORKING GROUP IN THE FIELD OF SCIENCE POLICY

(Moscow, September 23-27, 1974)

In accordance with the decision adopted at the Second Session of the US-USSR Joint Commission on Scientific-Technical Cooperation (November 1973), a meeting was held in Moscow during the period September 23-27 of the US-USSR Joint Working Group in the Field of Science Policy, and of working subgroups in the areas of:

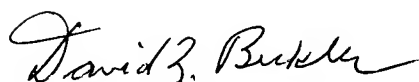
Planning and Management of Scientific Research  
and Development;

Financing Research and Development;

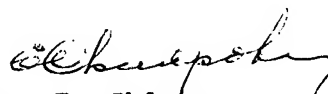
Training and Utilization of Scientific and Engineering-Technical Personnel;

Systems of Stimulating Development of Fundamental Research.

The results of the activities of the Working Group during the past period were reviewed at these sessions and detailed plans of work, including related methodological questions, were discussed. As a result of frank and comprehensive discussion of questions of science policy, the American-Soviet working subgroups (see attached list) developed fully agreed upon proposals for further cooperation in the indicated areas within the framework of the Joint Commission.



D.Z. Beckler  
Co-Chairman American side  
US-USSR Joint Working Group  
in the Field of Science  
Policy



Ye. I. Sklyarov  
Co-Chairman Soviet side  
US-USSR Joint Working Group  
in the Field of Science  
Policy

LIST OF EXPERTS WHO PARTICIPATED  
IN THE SESSIONS OF THE US-USSR JOINT WORKING  
GROUP ON SCIENCE POLICY, SEPTEMBER 23-27, 1974 IN MOSCOW

D.Z. Beckler                      Chairman of the American side of the  
Working Group on Science Policy,  
National Academy of Sciences of the US

Ye. I. Sklyarov                  Chairman of the Soviet side of the  
Working Group on Science Policy,  
State Committee of the Council of  
Ministers USSR On Science and  
Technology (SCST)

Subgroup I: "Planning and Management of Research and  
Development"

American Side



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Soviet Side

Ye. I. Sklyarov	<u>Chairman</u> , SCST
K.A. Yefimov	State Planning Committee USSR
I.D. Ivanov	Institute of the USA of the Academy of Sciences
K.I. Toksir	Institute of Economics of the Academy of Sciences
Yu. M. Sheynin	Institute of History of Natural Sciences and Technology of the Academy of Sciences

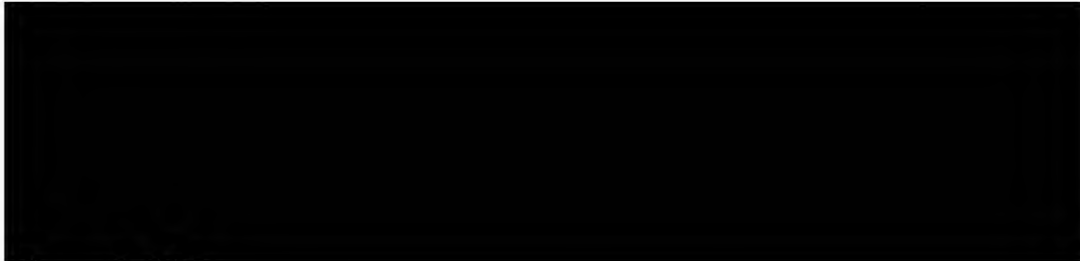
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A.S. Yurkevich SCST

V.V. Sladkov SCST

Subgroup II: "Financing Research and Development"

American Side



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Soviet Side

Ye. Ye. Grishayev Chairman, SCST

L.Z. Glyazer Institute of Economics of the Academy  
of Sciences, USSR

Yu. K. Petrov State Planning Committee

V.I. Maslennikov Institute of the USA of the Academy of  
Sciences

S.I. Pirogov Institute of Economics of the Academy  
of Sciences

D.M. Lyubimova Central Statistical Administration

S.A. Sitoryan Ministry of Finance

Subgroup III: "Training and Utilization of Scientific and  
Engineering-Technical Personnel"

American Side



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Soviet Side

V.I. Krutov	<u>Chairman</u> , Ministry of Higher and Specialized Secondary Education
S.R. Mikulinskiy	Institute of History of Natural Sciences and Technology of the Academy of Sciences
S.A. Kugel'	Leningrad Division, Institute of History of Natural Sciences and Technology
Ye. N. Zhil'tsov	Moscow State University
A.S. Ryabinin	Moscow State University
M.M. Poluboyarinov	Central Statistical Administration
B.M. Remennikov	Ministry of Higher and Specialized Secondary Education
V.N. Andriyeshin	SCST

Subgroup IV: "System of Stimulating the Development of  
Fundamental Research"

American Side



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Soviet Side

V.A. Filippov	<u>Chairman</u> , Academy of Sciences
S.V. Nemchinov	Academy of Sciences
N.M. Kiselev	Academy of Sciences
O.I. Larichev	Ministry of Precision Instrument Building, Means of Automation and Control Systems

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V.S. Boychenko

Ministry of Precision Instrument Building,  
Means of Automation and Control Systems

M.K. Albertyan

Ministry of Precision Instrument Building,  
Means of Automation and Control Systems



ATTACHMENTS:

- I. Summary Report of the Measures Taken on Cooperation in the Field of Science Policy
- II. Explanatory Note to the Agreed Plan of Work for Scientific-Technical Cooperation Between the US and USSR in the Field of Science Policy
- III. Revised Program of Future Work in Accordance with the Topics of Cooperation in the Field of Science Policy Agreed Upon During the Period November 19-23, 1973.
- IV. Reports and Plans of Future Work of the Subgroups of Experts of the Working Group in the Field of Science Policy

ATTACHMENT NO. I

SUMMARY REPORT OF THE MEASURES TAKEN  
ON COOPERATION IN THE FIELD OF SCIENCE POLICY

In accordance with the subjects of cooperation in the field of science policy approved at the second session of the US-USSR Joint Commission on Scientific and Technical Cooperation, organizational steps were taken on the following topics:

Planning and management of scientific research and development;

Financing research and development;

Training and utilization of scientific and engineering manpower;

Systems of stimulating the development of fundamental research.

Working subgroups were created for each of the study topics, and the scientific organizations which should be involved in the performance of the work were identified. There has been an exchange of lists of questions on the subjects of cooperation for review and response. Then each side identified the questions which were of greatest interest to it. In the area of fundamental research, the Soviet side has prepared and already transmitted to the American side answers to the questions posed by the American side and at the same time has received answers to its questions.

In addition, within the framework of the Joint Group of Experts on Science Policy, an American/Soviet conference on questions of organization and management of industrial research and development was held in Washington during June 1974. Four Soviet and six American representatives delivered papers at this conference (the papers are to be published in the U.S. and U.S.S.R. in the next six months).

ATTACHMENT NO. I

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During its stay in the U.S., the Soviet delegation was given the opportunity of visiting scientific centers and enterprises in New York, Los Angeles and San Francisco, Similarly, during the period September 15-October 4, 1974, members of the American delegation visited scientific centers and scientific production associations in Moscow, Novosibirsk, Leningrad and Kiev.

Thus, the preliminary stage of work has been completed.

ATTACHMENT NO. II

EXPLANATORY NOTE ON THE AGREED PLAN OF WORK FOR  
SCIENTIFIC-TECHNICAL COOPERATION BETWEEN  
THE U.S. AND U.S.S.R. IN THE FIELD OF SCIENCE POLICY

The detailed plan for further work reflects the agreement of the sides on the form of cooperation and type of results desired.

The sides agreed that during the period 1975-1976, survey reports will be prepared which characterize the national systems of planning and management of scientific research and development, the financing of research and development, the training and utilization of scientific and engineering-technical personnel, and stimulation of the development of fundamental research. For all four topics, preliminary plans for the survey reports were agreed.

In order to study how the national systems of planning and management in the area of science policy function in practice, the sides have agreed to examine the processes on the basis of individual examples and case studies.

As to planning and management of research and development, financing of research and development, and training and utilization of scientific and engineering-technical personnel, the sides agreed on the possible types of problems which can be worked out in the future for more detailed study. A list of case studies was agreed upon for the work concerning stimulation of the development of fundamental research.

In connection with the specification of the problems to be studied in each of these four topics, agreement was reached on the use of various methods of carrying out the work. In particular, on the topic of financing of science (research

ATTACHMENT NO. II

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and development) the sides agreed to append to the reports statistical data characterizing expenditures on science during the calendar years 1970-1973, inclusive.

As to the training and utilization of scientific and engineering-technical personnel, the sides agreed to exchange curricula, study programs, and statistical tables.

The work plan on fundamental research also includes the joint conduct of a review of the current status of atmospheric modelling and weather forecasting.

The sides have agreed on the organizational forms of carrying out the work for each topic and the timing for reaching the specified goals. In particular, it is stipulated that, in addition to direct correspondence during the course of the work, there will be meetings and consultations of the subgroup leaders and the mutual exchange of experts in the conduct of the work.

REVISED PROGRAM OF FURTHER WORK IN ACCORDANCE  
WITH THE TOPICS OF COOPERATION IN THE FIELD OF  
SCIENCE POLICY AGREED UPON DURING NOVEMBER 19-23, 1973

I. Planning and Management of Scientific-Research and Development

1. By December 1974, short answers to each question will be prepared and exchanged. Analysis of the answers and the issues meriting detailed study will be completed by February 1975.
2. During subsequent joint meetings, the topics of detailed studies will be approved, the first such session will take place in March 1975 at which time it is expected that the topics of at least two case studies will be reviewed and approved.
3. Both sides will send experts to review any questions which arise.
4. In accordance with the planned activities, each side will submit to the other by September 1975, its survey reports taking into account the six subjects agreed upon in November 1973 and the answers to the questions posed by the sides. By December 1975, the sides will exchange additional information based on the materials received.
5. During February 1976, there will be a final joint review and agreement on the prepared materials, and in April of 1976, the agreed upon materials, together with necessary revisions, will be submitted as the product of the work on the subject "Planning and Management of Research and Development."

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II. Financing of Science (Research and Development)

1. By November 1974, the sides will exchange comments on the corrected preliminary outlines of the survey reports. Each side will submit their comments on the revised outlines by January 1975. A small group of experts will meet during the first quarter of 1975 (date to be decided later) for consideration of questions in connection with the preparation of the survey reports.
2. The experts of both sides will meet in September 1975 in order to review questions generated after examination of the survey reports with the aim of agreeing on preliminary plans for preparing scientific papers on comparative analyses. The papers on comparative analyses will be completed by December 1975.
3. Study groups will meet in the first quarter of 1976 to review the comparative analyses and to agree upon proposals for the plan, content and procedure for preparing the summary report.
4. Discussion and approval of the final report will take place at the working session of the joint working subgroup by June 1976.

III. Training and Utilization of Scientific and Engineering-Technical Personnel

1. By November 1974 the sides will exchange available instructional materials, individual curricula and course programs in order to compare the level of training of specialists with higher education in a

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2. For more profound study of the methods used in preparing the statistical tables and content of the final reports, the sides will exchange visiting foreign experts for a period up to three months (first quarter of 1975).

The sides have agreed that, as may be necessary, there will be short visits of 1-2 experts to resolve questions which arise during the course of the work.

3. The sides will exchange tables containing statistical data for one year or one field, together with appropriate comments on their content by March 1975.
4. By March 1975, the sides will submit to each other an outline of the survey report, taking into account paragraphs 1 and 2 of theme III of the Program for Scientific-Technical Cooperation Between the U.S. and U.S.S.R. in the Field of Science Policy, in order to have a discussion of the report in October 1975.
5. By June 1975, there will be an agreed-upon list of problems which require in-depth study.
6. In October 1975, there will be a joint meeting of the subgroup for a discussion and agreement on the materials submitted by each side they deem necessary for the final report.
7. By May-June 1976 there will be the elaboration and joint delivery of the survey reports in accordance with the program of scientific-technical cooperation.



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IV. Stimulation of the Development of Fundamental Research

1. Each side will prepare a detailed draft outline of the survey reports on national systems for stimulation of the development of fundamental research. The sides will exchange these drafts by the end of 1974. Within 2 months thereafter, there will be an exchange of comments on the drafts.
2. After consultation with a national group of experts, groups of experts will meet in the spring of 1975 to discuss the two draft outlines, as well as comments on these drafts, and to agree upon the final outlines of the national survey reports.
3. At the initial stage of work on the survey reports, there will be an exchange of visits of experts (2-3 weeks duration).
4. By August 1975, there will be an exchange by the sides of the draft survey reports. By October 1975, a meeting of the experts and study groups will take place in order to exchange comments on the prepared survey papers and to decide on the final report and develop recommendations for continued cooperation.

In addition, the sides will carry out work on the preparation of information for case studies. In particular,

1. By the end of 1974, each side will exchange detailed outlines of the description of selected case studies.

Within a two-month period, the sides will exchange comments on the detailed outlines. During the

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of experts, as may be mutually agreed.

2. By August of 1975, the sides will exchange reports which contain the results of the case studies.

The sides will exchange comments on the materials received within the following six weeks.

3. The final documents will be prepared by October 1975.
4. The sides have agreed on the desirability of carrying out a joint technical assessment on the status of atmospheric modelling and weather forecasting in accordance with the work program.

ATTACHMENT NO. IV

REPORTS AND PLANS OF FURTHER WORK OF THE SUBGROUPS  
OF EXPERTS OF THE US-USSR JOINT WORKING GROUP IN THE FIELD  
OF SCIENCE POLICY.

ATTACHMENT IV-1

JOINT REPORT OF SUBGROUP I  
PLANNING AND ADMINISTRATION  
OF  
RESEARCH AND DEVELOPMENT

I. The American and Soviet parties participating in the Moscow meeting have achieved all the objectives in a spirit of fruitful discussions. Both parties expect that successful exchanges of experience in the planning and administration of science and technology will result in advances in human and economic development.

II. The main task of the Moscow meeting was to consider means for implementing the decisions of the second session of the Joint US-USSR Commission on Cooperation in Science and Technology, in which the following topics of science policy were identified:

- Planning and administration of R&D
- Financing R&D
- Training and utilization of scientific and engineering personnel
- System of stimulating the development of fundamental research

Working groups have been formed for all these topics and supporting institutions identified for fulfilling the work. Exchanges of questions have been completed by all four groups.

III. The accomplishments for the group on management and administration thus far are substantial.

A program of cooperation was prepared.

As a result of mutual exchange, members of the US-USSR delegations visited a number of governmental, scientific and

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industrial facilities so that each side could become more familiar with science policy practices of the other country.

Lists of questions, which have been exchanged, have been found acceptable for consideration. During the Moscow meeting the feasibility of preparing answers has been agreed to. Each aide has informed the other as to which questions have the most importance.

A conference on the organization and management of industrial R&D was arranged and held in June 1974 in the U.S. Seven U.S. presentations and four Soviet presentations were given.

The seven American presentations were:

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The four Soviet presentations were:

- O.I. Larichev (Institute of Control Problems), "The Selection of Preferred Variants of a Project"
- O.V. Filatov (General Director of the "Svetlana" Association), "The Transfer of Scientific Research and Development from Laboratories to Production"
- S.V. Nemchinov (Deputy Head of the Science-Organization Department of the USSR Academy of Sciences), "Organizational Forms of Transferring the Results of Basic Research Into Industry"
- K.A. Efimov (Head of a Department at the USSR GOSPLAN), "Organization of the Elaboration and Realization of Large Interbranch Scientific and Technological Programs"

The participants in the Moscow meeting agreed that the preparation of texts and the publication of these presentations by both the U.S. and the USSR will be completed within six months.

IV. Looking to the immediate future, the participants on R&D Organization and Administration are in full agreement on the following points.

- An initial short response by each side to all questions will be exchanged within 2 months (December 1974).
- Upon receiving these initial answers, they will be analyzed by the respective sides. This analysis will identify those areas of R&D management and planning which merit study in greater depth. This work will be

- Future joint meetings will approve the topics to be studied in more detail. The first meeting will be in March 1975, at which time case study topics will be considered and approved. At the time a case study is approved by both sides, a two-month period will be allowed for exchange of outlines. These outlines will contain statements which define the structure, contents, methodology, approach, and participants responsible for the conduct of the case study.
  - Both sides agree that there will be at least two topics on each side which will require case studies. These case studies will require the mutual exchange of experts during the next year for extended periods of time. These expert visits will be to a specific facility for a specific task. The parties will strive to select case studies on common topics. Among the kinds of studies would be experience with cost effectiveness in planning R&D, methods of project management, and factors which influence utilization of R&D results.
  - In general, both sides agree to a flexible approach to the analysis of the questions. Besides the previously-mentioned case studies, a variety of methods are considered appropriate including special papers, conferences, and group meetings, and possibly other methods.
- V. In accordance with the planned activities:
- By September 1975 each side will submit to the other side its survey reports, taking into account the answers each side has given to the questions,

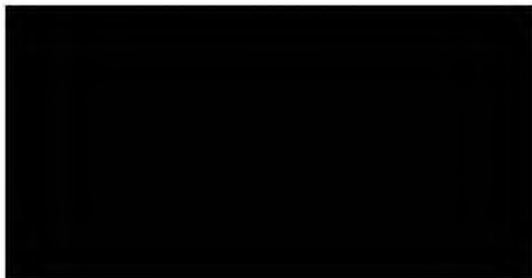
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and reflecting the six principal issues which were agreed to in November 1973 as subjects for consideration.

- By December 1975 the sides will conduct an exchange of additional information on the material received.
- In February 1976 there will be some mutual consideration of the prepared materials.
- In April 1976 the agreed-upon materials, revised as may be necessary, should be submitted to constitute the outcomes of the activities on Subject I -- the planning and administration of scientific research and development.

#### VI. Conclusion

Both sides recognize that the work program will require serious commitment of national support, and that a successful result can establish a promising foundation for continued exchanges of knowledge in the years to come. In this spirit, the two sides consider the Moscow meeting a milestone on the road to lasting cooperation based on understanding.



Ye. I. Sklyarov

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ATTACHMENT IV-2

RECORD OF DISCUSSION OF THE MEETING OF  
THE U.S.-USSR JOINT GROUP OF EXPERTS ON  
THE FINANCING OF SCIENCE (RESEARCH AND DEVELOPMENT)  
SEPTEMBER 23-26, 1974

In accordance with the program for cooperation in the field of science policy approved by the Second Session of the Joint Soviet-American Commission, the working subgroup on financing research and development has been formed and papers outlining the general areas of interest and proposed scope of studies to be undertaken have been exchanged.

The working subgroup on financing research and development has concluded that the initial (preparatory) phase of the work of the Program adopted at the November 1973 meeting should be extended, in view of the fact that elaboration of mutually agreed upon methodological principles requires detailed and comprehensive study.

After exchanging opinions, both sides have agreed on the basic principles of future work:

(1) Preparation of surveys, "The system of financing research and development in the U.S." and "The system of financing science in the USSR", which shall pay particular attention to illuminating methodological problems. The surveys will be prepared by working groups of experts of the U.S. and USSR, respectively. Target date for completion: by 30 June 1975.

- a. Preliminary outline of survey reports attached.
- b. Each side to exchange by November 1974 revisions and clarifications of the preliminary outline.
- c. Each side to comment on revised outline proposed by the other side by January 1975.

d. Small group of experts to meet during the first

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quarter of 1975 (date to be decided later) to consider problems in connection with the preparation of the survey reports.

(2) Experts to meet in September 1975 to review and discuss questions generated after the examination of survey reports with the aim of coming to an agreement on preliminary plans for preparing scientific papers on comparative analyses.

(3) Each side will prepare scientific papers on comparative analyses with their findings on the following problems: similarities and differences between the respective systems of financing; selection of indicators for comparison; elaboration of principles and methods of comparison. Scientific papers on comparative analyses should be finished by December 1975. In case of necessity while preparing the above mentioned material, there can be working consultations of experts.

(4) Study groups to meet to review and discuss comparative analyses during the first quarter of 1976 (date to be decided later) and agree on proposals for the plan, content and procedure for preparing the summary report called for by the program of cooperation.

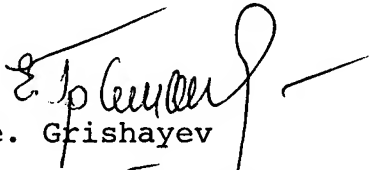
(5) The draft of the final report should be prepared by the experts of both countries. Discussions and approval of the final report at a working meeting of the Joint Study Group by June 1976.

(6) Both sides recognize that in the course of fulfilling the proposed program there can appear a necessity for more detailed studies of a number of complex problems which would require joint studies (for example, incentives for scientists and others working in Research and Development, composition of overhead expenses, etc.). Additional

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such studies will be exchanged by correspondence and considered at the next scheduled meeting of experts (mentioned in item 1d above) who will then make appropriate recommendations to the chairmen of the working subgroup. The chairmen will decide the action to be taken.

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Ye. Ye. Grishayev  
Chairman of the Soviet side  
Working Subgroup on Financing  
Research & Development



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ATTACHMENT

Preliminary Outline of Survey Reports

1. Objectives of the survey report.
2. Descriptions and definitions of the concepts of "science" in the Soviet survey report and "research and development" in the American survey report including definitions of the boundaries between science (research and development) and other activities with the aim of defining those funds which are used for science (research and development).
3. Descriptions of classes of organizations performing research and development and financed by funds for science.
4. Descriptions of the manner in which funds for science (research and development) are planned.
5. Descriptions of methods for reviewing and controlling expenditures of performers.
6. Descriptions of the composition of the major cost elements of science (research and development).
7. Descriptions of the mechanisms for financing science (research and development).

STATISTICAL TABLES TO BE PROVIDED  
(1970-1973 calendar years)

(Each table will include definitions of terms used.)

- I. Total expenditures distributed by appropriate classes of performing organizations.
- II. Total expenditures distributed by type of scientific work (basic research, applied research, development), using estimates if necessary.
- III. Total operating expenditures distributed by sources of financing.

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IV. Total operating expenditures distributed by cost element (wages and salaries, equipment, materials, etc.) using estimates if necessary.

ATTACHMENT IV-3

RECORD OF DISCUSSIONS OF THE MEETING OF THE  
SUBGROUP ON THE TRAINING AND UTILIZATION  
OF SCIENTIFIC AND ENGINEERING-TECHNICAL  
PERSONNEL OF THE U.S.-U.S.S.R. JOINT GROUP  
OF EXPERTS IN THE FIELD OF SCIENCE POLICY

(Moscow, U.S.S.R., September 23-25, 1974)

The subgroup met in Moscow to review progress, to further the plan of work and to agree upon a schedule for completion of its portion of the Program of Scientific and Technical Cooperation between the U.S. and the U.S.S.R. in the Field of Science Policy that was adopted by the Joint Group of Experts in the Field of Science Policy on November 23, 1973.

The U.S. and U.S.S.R. members of the subgroup who participated in the meeting are listed in Attachment 1.

In accordance with the agreement reached at the joint meeting in Washington on November 19-23, 1973, the two sides have exchanged information and statistical table shells which should be filled with data to be provided by each side. This information is concerned with the problems of training and employment of scientific and engineering technical personnel in the USSR and in the USA which are the subject of the third program of scientific-technical cooperation between the two countries in science policy.

The materials delivered by the two sides differed somewhat in approach and such points as the methods of estimation and degree of detail in the table shells and in the concepts and categories which are in the schemes.

These discrepancies arise from differences in the methodology of statistical records available in the two countries.

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The table, shells, 22 concerning the USA and 17 concerning the USSR, provided the basic topic for discussion at the joint meeting of the Soviet and American experts on September 23-25, 1974.

As a result of the discussion an agreement was reached on the forms and content of the tables.

The two sides elaborated the following calendar plan of the second stage of the investigation on the theme "Training and Employment of the Scientific and Engineering-Technical Personnel".

1. The two sides will exchange available instructions which permit understanding of the methods used by the sides in collecting the necessary statistical data for preparing tables. In addition, there will be an exchange of examples of curricula and of course programs for the training of specialists at the baccalaureate level in physics, botany and civil engineering, November 1974.

2. For more profound study of the methodologies for preparation of the statistical tables and the content of final reports, both sides will exchange visiting foreign specialists for a period of up to three months, first quarter 1975. Both sides have agreed that short visits of one or two persons, as may be necessary, may be arranged at any time during the course of the work in order to obtain agreement on any problems which have arisen.

3. The sides will exchange tables containing statistical data for one year or one field of each of the subject tables

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with the corresponding methodological comments on their composition, March 1975. By March 1975 the sides will submit to each other a prospectus of the contents of the survey report, including the subjects detailed in paragraphs 1 and 2 of theme III of the Program of the Scientific and Technical Cooperation between the USA and the USSR in the field of science policy; this will be done in anticipation of the meeting in October 1975.

In preparing the outlines, each side will identify and exchange lists of a small number of important questions that each believes should be made the subject of in-depth analysis by specially convened experts on both sides. Such questions might include, for example:

- a. Differences in the level, breadth, and specialization of education of engineers.
- b. Comparative study of education for the Kandidat in the USSR and the Ph.D in the USA.
- c. Method of planning or predicting future needs for scientists and engineers.
- d. Or others.

By June 1975 the two sides will agree upon which problems require special in-depth comparative studies and on the study procedures.

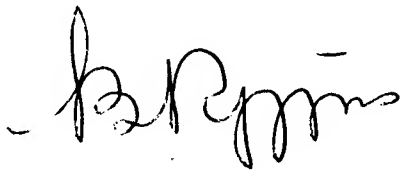
4. The study of the material delivered to the other side and exchange of any questions concerning the materials, June 1975.

5. Making precise the tables and methodologies of their composition previously submitted. Have a discussion and agreement on the materials submitted by each side necessary for the final report at a joint meeting of the subgroup October 1975.



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6. The elaboration and joint delivery to each other of the Report noted in theme III, related to "Training and Employment of the Scientific and Engineering-Technical Personnel" in accordance with the Program of the Scientific-Technical Cooperation between the USSR and the USA in science policy.  
May - June 1976.

A handwritten signature in cursive script, appearing to read "B. Ryzin".

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ATTACHMENT 1

Participants in the meeting of the subgroup on Scientific and Engineering-Technical Personnel, Moscow, U.S.S.R., September 23-25, 1974.

U.S. Participants:

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U.S.S.R. Participants:

V.I. Krutov, Chairman, Ministry of Higher and Specialized Second Education

S.R. Miku~~R~~inskiy, Institute of History of Natural Sciences and Technology

S.A. Kugel', Leningrad Division, Institute of History of Natural Sciences and Technology

Ye. N. Zhil'tsov, Moscow State University

A.S. Ryabinin, Moscow State University

M.M. Poluboyarinov, Central Statistical Administration

B.M. Remennikov, Ministry of Higher and Specialized Second Education

V.N. Andriyeshin, State Committee for Science and Technology  
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Attachment IV-4

RECORD OF THE JOINT WORK OF THE SUBGROUP  
ON THE PROBLEM "SYSTEMS OF STIMULATING  
THE DEVELOPMENT OF FUNDAMENTAL RESEARCH"  
WITHIN THE FRAMEWORK OF THE AMERICAN-SOVIET  
COOPERATION IN THE FIELD OF SCIENCE POLICY

(Moscow, September 23-25, 1974)

In accordance with the approved program of scientific and technical cooperation in the field of science policy, a subgroup of experts in "Systems of Stimulating the Development of Fundamental Research" met in Moscow September 23-25, 1974. In attendance at the meeting were:

From the American side:



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From the Soviet side:

V. A. Filippov, USSR Academy of Sciences, Co-chairman

S. V. Nemchinov, USSR Academy of Sciences

N. M. Kiselev, USSR Academy of Sciences

O. I. Larichev, Institute of Control Problems

V. S. Boychenko, Institute of Control Problems

M. K. Albertyan, Institute of Control Problems

The following questions were discussed at the meeting.

1. Results of the work during the period following approval of the work plans. Both sides take a positive view of the results of the work since the agreement of November 1973.

-2-

2. Goals and detailed plans for carrying out work in the following directions:

- a. Preparation of surveys which characterize the national systems of stimulating the development of fundamental research;
- b. Preparation of case studies illustrating the process of decision making;
- c. Preparation of joint surveys which include critical analyses of the current status of specific fields of fundamental research.

In the course of the discussions, both sides came to agreement on the possible means of cooperation on each question under discussion and have elaborated specific plans of further work.

I. Surveys Characterizing National Systems of Stimulating the Development of Fundamental Research

Surveys will be prepared which contain a description of the basic features of the systems for the formulation of national science policy in the U.S. and the U.S.S.R. in the area of fundamental research, the management of fundamental research and the transfer of the results of fundamental research to application.

To facilitate the comparison of the systems, a common approach will be used by both sides in the preparation of parallel surveys. It is agreed that the surveys will be analytical in nature and will contain critical analysis of the systems being described. The assessment of the strengths

-3-

and weaknesses of the systems will be illustrated by examples from the field of physics.

Attachment 1 contains the agreed plan of work on the surveys. Attachment 2 contains a preliminary outline of the surveys. These agreed-upon plans will be the basis of the future joint work.

II. Case Studies Characterizing the Process of Decision-Making in the Area of Development of Fundamental Research

Both sides have agreed to prepare a number of in-depth case studies in order to analyze the processes of decision-making concerning problems of developing and implementing national policies for fundamental research. These case studies are intended to analyze how the national systems of planning and decision-making in the area of fundamental research work in practice.

Attachment 3 contains a list of agreed case studies. Attachment 4 contains an agreed plan of work for the case studies.

III. Critical Reviews of the Current Status of Specific Fields of Fundamental Research

The approved program of scientific and technical cooperation between the U.S. and the USSR in the area of science policy includes as a subject of cooperation joint analysis and assessment of scientific questions of mutual interest which can have important influence on national problems.

The joint working subgroup on the system of stimulating the development of fundamental research has agreed to

-4-

recommend to the National Academy of Sciences of the U.S. and the Academy of Sciences of the U.S.S.R. that they undertake jointly an assessment of the status of research in the area of atmospheric modelling and weather forecasting. This assessment of the status of research in this field would build on a long and effective tradition of cooperation between the two countries in collection and exchange of atmospheric data, and would contribute to the existing cooperation between the countries, as well as to worldwide international cooperation.

Attachment 5 contains a plan for joint work on the  
given problem.  
STATOTHR



V. A. Filippov  
Chairman of the Soviet side  
of the Working Subgroup on  
the Problem "Systems for  
Stimulating the Development  
of Fundamental Research"

PRELIMINARY OUTLINE FOR THE PREPARATION  
OF SURVEYS CHARACTERIZING THE NATIONAL  
SYSTEMS OF STIMULATING THE DEVELOPMENT  
OF FUNDAMENTAL RESEARCH

1. Each side will establish organizational mechanism to prepare the survey.
2. Each side will establish a group of experts who will have responsibility for the contents of the survey. The group of experts will include prominent physicists.
3. Each side will prepare a detailed draft outline of its national survey. The sides will exchange these draft outlines by the end of 1974. Within the following two months there will be an exchange of comments on the prepared draft outlines.
4. After consultations with their national group of experts there will be a meeting of the national study groups in the spring of 1975 to discuss both draft outlines and agree on the final outline of the surveys.
5. In the initial stage of work on the surveys, representatives of the study groups will exchange visits (2-3 weeks duration).
6. The survey papers as initially prepared by each side will be exchanged by August 1975, followed by a joint meeting of the experts and study groups by October 1, 1975 to exchange comments on the prepared survey papers and to prepare a general report and formulate recommendations for continued cooperation.

PRELIMINARY OUTLINE OF SURVEY OF NATIONAL  
SYSTEMS OF FUNDAMENTAL RESEARCH\*

- I. The development of science policy for fundamental research.
  1. Definition of the term "science policy for fundamental research"
  2. The need for developing a science policy for fundamental research
  3. The formulation of science policy for fundamental research
    - a. Factors which influence science policy for fundamental research
      - (1) overall governmental policy and objectives
      - (2) the scale of overall expenditures for research and development
      - (3) the goals and levels of financing research and development from governmental and private sources
      - (4) the level of development of various scientific fields
      - (5) the available financial and trained manpower resources

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NOTE: The surveys shall be written in order to facilitate mutual understanding and inter-comparision of US and USSR systems for fundamental research. Thus survey will draw on examples from the field of physics to illustrate the processes of planning and management of fundamental



- b. Difficulties in the formulation and implementation of national science policy for fundamental research
    - c. Existing mechanisms for formulation of science policy for fundamental research
    - d. Methods of implementing science policy for fundamental research
  - 4. Retrospective analysis of the results of implementing through a number of years a certain science policy for fundamental research
  - 5. Analysis of alternative methods and alternative organizational arrangements for the development of national policy for fundamental research
- II. The management of fundamental research
- 1. Definition of the term "management of fundamental research"
  - 2. Methodological aspects of fundamental research management
    - a. in the area of forecasting
    - b. in the area of planning: short term, medium term, long term
    - c. in the determination of priorities within and among fields of fundamental research
    - d. in the formulation of programs, the determination of the amount of resources and their allocation for fundamental research

-3-

- e. in the creation and development of centers for fundamental research, their geographic distribution, and the allocation of resources among new and existing centers
  - f. in the planning of unique and expensive experimental facilities for fundamental research
  - g. in the planning and coordination of multi-disciplinary research
  - h. in the planning of fundamental research in meeting particular societal needs
  - i. in the termination of non-promising areas of research investigation and the redirection of efforts of research institutions
  - k. in the use of management information systems in decision making for fundamental research
- 3. Existing organizational mechanisms in the fundamental research management system, their structure and effectiveness
  - 4. Analysis of alternative methods and alternative organizational arrangements for the management and conduct of fundamental research
- III. The role of higher educational institutions, research institutes, and industrial research organizations in the conduct of fundamental research

-4-

IV. Transfer of the results of fundamental research to application

1. Critical analysis of the state of the problem
  - a. existing organizational arrangements and management procedures for transferring the results of fundamental research to application and trends in their development
  - b. the existing system for planning and stimulation of activity in the transfer of fundamental research to application, i.e., science application
  - c. advantages and disadvantages of existing organizational arrangements and methods of management and stimulation of the transfer of results of fundamental research to application
2. Development and analysis of possible organizational arrangements and methods for the transfer of the results of fundamental research to application
  - a. possible alternative organizational forms and methods of management (planning, etc.)
  - b. possible alternative methods to facilitate the transfer of the results of fundamental research to application

-5-

c. the social and psychological aspects of the problem

3. Analysis of possible means of improving existing systems for transferring the results of fundamental research to application. Questions concerning the peculiarities of the systems for safeguarding patents, copyrights, know-how, etc., export and import licenses, industrial secrecy, etc.

Attachment 3

LIST OF AGREED CASE STUDIES CONTAINING  
RETROSPECTIVE ANALYSES OF DECISION-MAKING  
PROCESSES IN THE AREA OF FUNDAMENTAL RESEARCH

1. Decision-making in the Development of a Unique Scientific Facility.

U.S.: A study of the decision to construct a large  
radiotelescope, the VLA

U.S.S.R.: A study of the decision to construct a  
large optical telescope

2. Organizational Mechanisms for Initiating New Fundamental Research Projects.

U.S.: A series of "ministudies" on several areas of  
fundamental research in which new initiatives  
have recently been taken

U.S.S.R.: A study of the development of organizational  
structure to undertake fundamental research  
on the problem of numerical methods of  
weather forecasting.

3. Resource Distribution in a Complex System of Organization of Scientific Research, Problems of Organization and Development of Scientific Centers.

U.S.: Brookhaven National Laboratory

U.S.S.R.: The Scientific City of Novosibirsk or  
Pushchino

4. Utilization of the Results of Fundamental Research in Applied Problems.

Examples will be selected by each side within a  
two-month period.

-2-

5. Retrospective Analysis of the State of Fundamental Research.

U.S.: A comparative study of two reports in the field of physics.

U.S.S.R.: A retrospective analysis of forecasting in the field of physics.

6. Comparative Analysis of Competing Organizations.

U.S.: A study of the procedures for the allocation of resources among research centers for materials science.

U.S.S.R.: A study of the selection process in the allocation of resources among scientific institutions engaged in the same field of research.

WORK PLAN FOR THE PREPARATION OF CASE STUDIES

1. Each side will develop organizational mechanisms for the preparation of description and analysis of the selected case studies.
2. Each side will exchange detailed draft outlines of the selected case studies by the end of 1974.
3. Within the following two months, the sides will exchange comments on the detailed draft outlines.
4. During the time of the writing of the case studies there will be exchanges of experts as mutually agreed upon.
5. The sides will exchange reports on the results of the case studies by August 1, 1975.
6. In the course of the following six weeks, the sides will exchange comments on the materials received.
7. The final documents must be completed by October 1, 1975.

Attachment 5

PLAN OF WORK FOR THE PREPARATION OF THE  
JOINT AMERICAN-SOVIET REPORT ON THE SUBJECT  
"ATMOSPHERIC MODELLING AND WEATHER FORECASTING"

1. Each side will establish a group of experts and inform the other side of its membership and chairman.
2. After an exchange of correspondence between the chairmen of the expert groups, each side will prepare an outline of a survey of the current state of atmospheric modelling and weather forecasting. The draft outlines will be exchanged by January 1, 1975. Within the following two months there will be an exchange of comments on the draft outlines.
3. The outlines will be combined in an agreed joint outline through correspondence or, if necessary, at a meeting of representatives of the two expert groups during the spring of 1975.
4. Each side will prepare papers according to the agreed outline. These papers will be exchanged by September 1, 1975 for subsequent study and exchange of comments.
5. There will be a meeting of the groups of experts in the fall of 1975 to discuss and agree on the contents of the overall report.
6. The final text of the joint report will be completed by July 1, 1976.



Record of Discussions  
of the meeting of the  
U.S.-U.S.S.R. Joint Group of Experts  
in the Field of Science Policy  
(Washington, D. C. November 19-23, 1973)

In accordance with the decision taken at the first meeting of the U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation in March 1972, a U.S.-U.S.S.R. Joint Group of Experts in the Field of Science Policy met in Washington, D.C., November 19-23, 1973, to prepare a specific program of cooperative activity in this area.

To carry out its work, each side of the Joint Group of Experts established four subgroups in the following subject areas headed by members of the Expert Group:

- I. Planning and administration of research and development
- II. Financing research and development
- III. Training and utilization of scientific and engineering-technical personnel
- IV. Stimulating the development of fundamental research

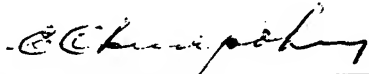
Based on preparatory work by the subgroups and the joint discussions in Washington, the Joint Group of Experts prepared and agreed on the attached Program of Scientific and Technical Cooperation between the U.S. and the U.S.S.R. in the Field of Science Policy and an accompanying note on this program.\*

\*Attached is a list of the members of the U.S.-U.S.S.R. Joint Group of Experts in the Field of Science Policy attending the meeting.

Record of Discussions  
November 19-23, 1973  
Page 2

Accordingly, the Joint Group of Experts submits for approval to the U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation the proposed work program together with the accompanying note as the basis for joint cooperative activity in the field of science policy under the auspices of the Joint Commission.

STATOTHR.

  
Ye. I. Sklyarov  
Coordinator, U.S.S.R. Side  
Head of the Science Management  
Department, U.S.S.R. State  
Committee for Science and  
Technology



November 23, 1973

Attachments:

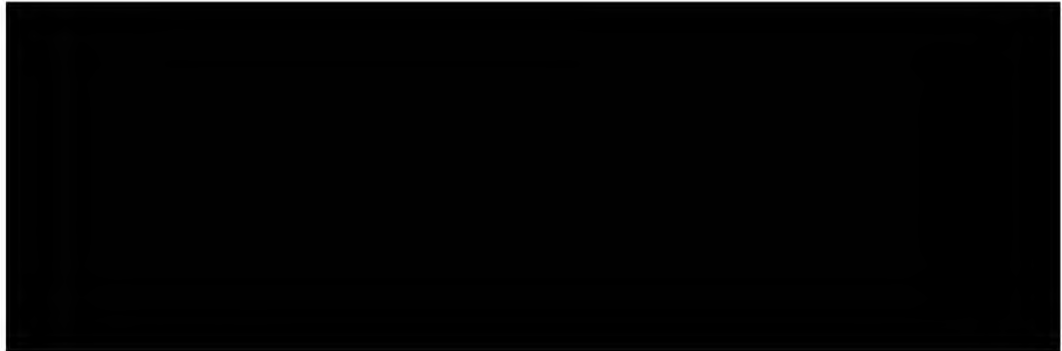
1. List of Joint Group of Experts
2. Note on the Program
3. Program of Scientific and Technical  
Cooperation between U.S. and U.S.S.R.  
in the Field of Science Policy

ATTACHMENT 1

U.S.-U.S.S.R. Joint Group of Experts in the  
Field of Science Policy

U.S. Members

STATOTHR



U.S.S.R. Members

- E. I. Sklyarov, Science Management Department, State Committee for Science and Technology, Co-Chairman
- V. A. Filippov, Science Management Department, U.S.S.R. Academy of Sciences
- V. I. Krutov, Ministry of Higher and Specialized Secondary Education of the U.S.S.R.
- V. I. Maslennikov, Institute of U.S.A., U.S.S.R. Academy of Sciences\*
- S. R. Mikulinskiy, Institute of History of Natural Sciences and Technology of the U.S.S.R. Academy of Sciences

In addition to the above, other members of the American and Soviet delegations participated in the work of the Joint Group of Experts.

\*Dr. V. I. Maslennikov substituted for the head of the Soviet side subgroup on financing research and development, Mr. E. E. Grishayev.

ATTACHMENT 2

U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation  
Joint Group of Experts in the Field of Science Policy

Note on the  
Program of Scientific and Technical  
Cooperation between U.S.-U.S.S.R. in the Field  
of Science Policy

In developing the plan of the attached program, the U.S.-U.S.S.R. Joint Group of Experts in the Field of Science Policy started from the mutually accepted thesis that the exchange of information on the practice of organization, planning, and financing of scientific research and development in the U.S.S.R. and U.S. will be very useful for both countries. At the same time, the program takes into account that the planning and report data published in the U.S. and the U.S.S.R. on the volume of scientific research and development, the size and structure of their financing, as well as the training and utilization of engineering, technical and scientific personnel are not directly comparable. That is because these data are formulated according to different methodologies partly reflecting differences of approach to the organization of research and development in the U.S. and U.S.S.R.<sup>1</sup>

Taking into consideration the insufficiency of information and the complexity and specificity of the problem areas, the study program entails the development of methodological procedures before beginning detailed joint studies in this area. It calls for preliminary discussions and studies on the basis of which papers will be prepared on mutually agreed subjects both by the Soviet and the American sides of the Joint Group of Experts, which will serve as the basis for appropriate findings and comparisons to be presented to the U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation.

<sup>1</sup>Reference Minutes of Discussion in the area of Scientific Policy signed in Moscow, 9-13 October 1972.

According to the agreed program, the projected work will be carried out in phases, that is:

First phase - discussion and agreement on the content of the papers to be prepared by each side, the methodological bases, and individual concepts and terminology, and agreement on plans for the preparation of the papers. It is expected that the first phase will be completed in the course of the first half of 1974.<sup>2</sup>

Second phase - preparation of papers by the working subgroups on each side, the exchange of such papers and the mutual study of them. It is expected that the second phase will be completed in the course of the first half of 1975.

Third phase - the exchange of additional information, agreement on the final papers and formulation of possible findings and comparisons and proposals for future cooperation by the fall of 1975.

Within the foregoing time phasing, it is expected that the work of the individual subgroups may progress at different rates.

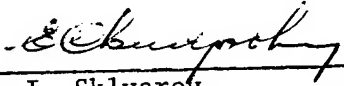
In carrying out the study, it will be desirable to encourage continuing communication between the corresponding subgroups including joint meetings and short and extended visits as needed to facilitate mutual understanding and the expeditious accomplishment of the work program. Close coordination of the four subgroups will be required, since it is not possible sharply to delineate their respective areas of work, nor would it be desirable to do so because of the inherent interrelationships of the subject areas involved.

<sup>2</sup>The subjects indicated in the second column of the attached study plan while generally descriptive of the intended areas of study will be further refined and elaborated during the first phase.

-3-

The planned program includes the direct cooperation between the Academies of Sciences of the U.S. and the U.S.S.R. in the field of fundamental science policies, since the stimulation of fundamental research needs to be considered in the context of the general system of measures characterizing national science policy. The program is not intended to duplicate or otherwise interfere with cooperation by the two Academies of specific questions of fundamental scientific research.

STATOTHR

  
Ye. I. Sklyarov  
Coordinator, U.S.S.R. Side  
Head of the Science Management  
Department, U.S.S.R. State  
Committee for Science and  
Technology



November 23, 1973

ATTACHMENT 3

PROGRAM

of Scientific and Technical Cooperation between U.S. and U.S.S.R.  
in the Field of Science Policy

Num- ber	Subjects of Cooperation	Chairmen of Working Subgroups (Responsible Coordinators) and Implementing Organizations	Procedures and Dates of Completion of Work
1	2	U.S.S.R. U.S.	5
I.	1. Planning and Administration of Research and Development	3	4
		Ye. I. Sklyarov	Phase I. Study Outline
		State Committee of the Council of Ministers, U.S.S.R., for Science and Technology	During the period required for the preparation of the study outline, each side will prepare and transmit to the other side a list of topics or issues which it would be interested in having the other side examine in the areas of national R&D policy and R&D management. Each side will submit a list of issues in which it is interested and will then evaluate its interest and will formulate in general terms the characteristics of the studies which it will prepare. In this, it would be desirable that each side would illustrate by means of examples the way several problems were resolved. In the first half of 1974, an agreement should be reached about the final character of the study.
1.	Science and technology policy as an integral part of the general government policy: problems in research and development (R&D), methods of planning of R&D, determination of the size and allocation of funds, manpower and materials for R&D, the characteristics of very important problem areas for R&D.	Institute of History of Natural Sciences and Technology of the U.S.S.R. Academy of Sciences; Institute of U.S.A. of the U.S.S.R. Academy of Sciences; Institute of the Problems of Management	
2.	System of decision-making management and coordination of R&D, the hierarchical structure of R&D management, including questions of		


STATOTHR

-2-

1	2	3	4	5
	<p>centralized and decentralized management, the coordination and management of R&amp;D in the field of very important complex problem areas, including research and development in industry.</p> <p>3. Contract system as an effective means of managing and stimulating the carrying out of R&amp;D.</p> <p>4. Problems and means of accelerating the transfer and practical utilization of the results of R&amp;D. (Support of the unity of the process: research - development - production - use.)</p> <p>5. Means for increasing the effectiveness of the administration of R&amp;D (evaluation of effectiveness, means for improving planning and management of R&amp;D).</p> <p>6. Management of R&amp;D on the level of the ministries, firms, and enterprises.</p>			<p><u>Phase II. Carrying out the study</u></p> <p>Each side will carry out its study of the issues and the case studies. There will be communication or joint consultation between the subgroup Chairmen as needed to resolve or clarify ambiguities or questions raised additionally by either side. It is proposed that this work be completed in early 1975.</p> <p><u>Phase III. Review and Agreement of the Results of the Completed Studies</u></p> <p>After finishing the second phase of work, both sides will exchange results of the research (studies). After a passage of time sufficient for the study of the indicated documents, a meeting of the subgroup should be called for the exchange of opinions. Each side will pay attention to the remarks of the other side and will inform it of its agreement to submit appropriate clarifications. After agreement on the revisions, the two sides will exchange the final versions of their research (studies) (in the second half of 1975).</p>



- 3 -

1	2	3	4	5
II.	<u>Financing Research and Development</u>	Ye. Ye. Grishayev State Committee of the Council of Ministers, U.S.S.R., for Science and Technology		<u>Phase I. Study Outline</u>
1.	Expenditures for Research and Development for the country as a whole by a) kind of work such as fundamental research, applied research, development (including design work and experimental work), construction of experimental stations and facilities, b) by groups of institutions performing the work (such as government, industry, various categories of higher educational institutions, research institutions), and c) insofar as possible, by field of science.			The first phase will entail both exchanges of materials and discussions at meetings with regard to concepts of and definitional differences in: methods, practices, policies, and financial arrangements for the support of R&D. It will include detailed study of the methodologies, definitions and concepts used in the collection, compilation and analysis of data on R&D expenditures and such other descriptive materials on the national economy as are needed to put the statistics in their proper perspective.
2.	Information on expenditures for research and development insofar as possible, according to:  (a) function (such as health and medicine, energy conversion and development, natural resources)  (b) sectors of the national economy (such as agriculture, industry, etc.), and branches of industry (such as building materials, coal, etc.)			During this phase, the parties will each list the types of data that can be made available and the types of data that each side would be interested in receiving from the other side.  After identifying the data areas of mutual interest, they will be examined with respect to: concepts, definitions, modes of data collection, completeness of coverage and attendant limitations. Means of achieving comparability will be developed insofar as possible and those peculiarities which in individual cases make comparisons difficult or impossible will be identified.

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- 4 -

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	(c) elements of expenditure, (wages, materials, etc.)			After the exchanges and comparisons carried out in this phase, agreement will be reached on the specific presentation of data that are to be prepared and exchanged during Phase II.
	(d) size of institution or firm			
	(e) geographic location			<u>Phase II. Carrying out the study</u>
3.	Information on sources of financing of total research and development (budget, own resources) as far as possible a) by groups of institutions performing the work and b) by means for transferring funds (contracts, institutional funding, etc.).			Data and other descriptive materials and analyses should be based upon the existing national systems of data collection and will not entail the collection of additional statistics. The data will be organized and presented according to a mutually agreed approach that will facilitate the most meaningful mutual understanding and comparisons.
4.	The types of information mentioned in points 1-3 shall cover, where possible, the period since 1950.			To permit a meaningful comparison between the two countries, attempts will be made to develop indices and criteria for comparing the volume of research and development in the two countries, including R&D exchange rates. These indices will be based on analyses of the relative costs of various R&D expense components such as: salaries and wages, equipment, overhead, etc.
				Following the exchange of data and information, each side will attempt to answer questions posed by the other side concerning the methods of collection, analysis, classification, or reporting of the data involved.

- 5 -

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Phase III. Joint examination

Finally, mutually agreed upon materials (reports) will be prepared. Analyses of information obtained will be undertaken to compare the levels of effort (in terms of expenditures) between U.S. and Soviet R&D programs. Such analyses could include, if possible, a few specific areas such as governmentally (state) sponsored research and development in energy, transportation, etc. Further studies, such as future projections, could be undertaken at a later date when experience and confidence in study methodologies hold forth sufficient promise of obtaining greater mutual understanding of both our systems for accomplishing national goals through research and development.

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## STATOTHR

## Phase I

III. Training and Utilization of Scientific and Engineering-Technical Personnel

1. Methods of determining demand for scientific and engineering personnel. Factors affecting choice of careers in science and engineering and measures used in influencing choice. The relationship of supply and demand for scientists and engineers.
2. Structure, number, and types of institutions of higher learning for the training of scientists and engineers. The levels of training of young persons that determine the possibility of entering social science, natural science, and technical degree programs in institutions of higher learning. Conditions for admission. Science and engineering curricula, by discipline, programs and forms of study (full or part-time). Management of institutions of higher learning from the standpoint of teaching and research. Numbers and professional levels of professional staff. Degree and forms of participation of teachers and students in the conduct of scientific research at institutions of higher learning.

V. I. Krutov and  
S. R. Mikulinskiy  
of the Ministry of  
Higher and Specialized Secondary  
Education of the  
U.S.S.R.; Moscow  
State University;  
Moscow Engineering  
Economics Institute;  
P. Lumumba Peoples  
Friendship University;  
Inst. of the History  
of Natural Sciences  
and Technology; Institute of U.S.A. of the  
USSR Academy of Sciences

Phase I will include a discussion and exchange of information on the concepts, methodology, and definitional differences, and the methods, practice and policy of training and utilization of scientific and technical manpower, including methods used in the collection, processing, and analysis of data. By February 1974 the subgroups will exchange dummy tables which each side can supply and which each side would like to receive, and which would be desirable to include in the papers of each side.

In May of 1974, during the joint meeting of the subgroups, it may be desirable to make more precise the material presented, the basic definitions, and lists of necessary data which each side will convey to the other.

## Phase II

In Phase II, the sides, in accordance with mutually agreed upon lists of questions and data, shall compile on the basis of national statistics necessary information about its country and will prepare a paper by February 1975.

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1	2	3	4	5
	<p>3. Statistics for years since 1950 on the training of scientific and technical manpower:</p> <p>(a) enrollments in and graduations from technical institutes and similar institutions, by type of institution (field); include examples of curriculum.</p> <p>(b) baccalaureate (first-level) degrees awarded by institutions of higher education, by all fields of study and by sex;</p> <p>(c) enrollments for graduate degrees, by field, by sex, by enrollment status (full or part-time);</p> <p>(d) earned advanced degrees in all fields, by field and sex;</p> <p>(e) sources and types of funds provided for support of higher education students, by enrollment status (full or part-time), level of education (undergraduate and graduate).</p> <p>(f) comparability of U.S. and Soviet degrees at all levels.</p>			<p>If it is necessary, a meeting of the full subgroups or their representatives can be held during the second phase, i.e. between May 1974 and February 1975.</p> <p><u>Phase III</u></p> <p>By February 1975, the sides will exchange papers and by May 1975 will complete their study of them. In this time period, the subgroups will formulate their questions and comments on the paper and transmit them to the other side. There will also be a mutual correlation of data on manpower with data on financing and adjustments may be made. The sides will evaluate the possibilities of adding to the papers in accordance with the desires of the other side, and by October 1975 will transmit the final papers to the coordinators on each side.</p>

-8-

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4. Statistics on scientific and technical manpower engaged in R&D, their total number and distribution by stages of R&D, fields of work or occupation, sectors and industries of the economy, types of scientific institutions, level of education, fields of training, age and sex.
5. In addition, it is desirable to provide statistics on the total number of scientists and engineers and their distribution by sectors of the economy (individual industries), field of work or occupation, level of education, fields of training, age and sex.
6. Types and amounts of monetary compensation paid to scientific and engineering personnel of various categories.
7. The number of technicians and examples of distributions of scientists, engineers, and auxiliary personnel engaged in R&D.
8. Upgrading of scientific and technical education, retraining, advancement of scientific and technical personnel, and methods of training for interdisciplinary research.

-9-

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IV. <u>System of Stimulating the Development of Fundamental Research*</u>	V. A. Filippov U.S.S.R. Academy of Sciences	<p><u>Phase I. Study outline</u></p> <p>As soon as possible there will be an exchange of lists of questions suggested for study. The respective study groups will prepare a one-page summary of the proposed study procedure for each of these questions. They may also suggest other issues for consideration. These summaries would be exchanged in February 1974.</p> <p>Each side will select about 10 of these studies for further development. They will transmit any further suggestions and questions on these 10 in March, 1974. The study procedures would be modified in the light of these comments. Final study procedures would be exchanged before the convening of a meeting of the working subgroups in early May 1974. This meeting would have as its primary agenda the resolution of remaining questions, the selection of 4-6 studies by each side, and the agreement on further procedures. This ends Phase I.</p> <p><u>Phase II. Carrying out the studies</u></p> <p>The work on the agreed upon topics will be initiated by each side, working independently. It would be valuable, however, to exchange progress reports about six months after the work begins.</p>		
1. General questions of policy in regard to fundamental research. Comparison of the U.S. and U.S.S.R. systems of financing and conducting fundamental research, including methods of determining the amount and allocation of expenditures for fundamental research; determination of priorities within and among fields of fundamental science; the interrelationship of expenditures for fundamental research with the general expenditures for R&D; the creation and development of important centers for fundamental research, principles of organization and distribution of these centers throughout the country, the question of allocation of resources between new and existing scientific centers.				
2. Comparison of the national systems and concepts of organization of fundamental research, the role of higher educational institutions, research institutes, and branch (industry) research organizations in conducting fundamental research. Development of indicators for the comparison of fundamental research efforts.				

\*Work on this theme is to be coordinated with the work on Topics I, II and III.

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3. The planning of fundamental research: development of long-range plans; selection of major directions of fundamental research and the determination of priorities for solution of most important problems; the planning of the development of fundamental research in relation to concrete problems and to possible practical applications; methods of accelerating the practical utilization of the results of fundamental research;

4. The planning of uniquely expensive experimental facilities for fundamental research, including determination of relative priorities for facilities construction; questions of balance between the numbers of qualified scientists and the availability of experimental research facilities.

5. Ensuring utilization of high quality scientific and technical advice in national policy and program determination: the identification and organization of appropriate advisors, ensuring the quality and objectivity of the recommendation, ensuring the timeliness of the input to policy determination and development of the program, identifying the appropriate role of the respective Academies in supplying this advice, government mechanisms for acquiring and utilizing such scientific and technical advice.

Therefore, the working subgroups will exchange short visits to the other country to hear progress reports, to comment on them, and to make further suggestions. These visits will be scheduled in October 1974. Draft reports will be exchanged in April 1975. This completes Phase II.

#### Phase III. Joint examination and review

Each side will review the draft reports it receives. The working groups will meet in May 1975 to survey progress, to make suggestions, and to plan the finalizing of the report. Each side will also submit written suggestions and criticisms to the authors of the various reports. Final drafts will be exchanged in the fall in preparation for a joint working session in October-November 1975. On the agenda of that meeting will be the acceptance of the final drafts, agreement on the final joint report, and agreement on recommendations and proposed plans for continued cooperation.



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6. Particular issues in the conduct of basic research: ensuring the quality of basic research, the identification and support of the brilliant young investigators, termination of less promising areas of research investigation, promoting interdisciplinary areas of research, the feasibility of organizing and planning basic research in meeting a societal need (e.g., cancer research); problems of obsolescence and development of new scientific instrumentation.
7. Joint analysis and assessment of key scientific questions which may have important influence on national problems of mutual interest, e.g., environmental effects.

V. General Questions of Planning and Organizing of the Joint Program of Cooperation in the Field of Science Policy

1. Coordination of work of chairmen of the working subgroups.
2. Preparation of joint findings and comparisons together with the chairmen of the subgroups.

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Technology.

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Conduct meetings of the U.S.S.R.-U.S. Joint Group of Experts in the Field of Science Policy to review the subgroup reports, discussion of problems connected with the exchange of contacts and papers, and preparation of the general report. The submission of joint findings and comparisons to the U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation within the indicated time frame.

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